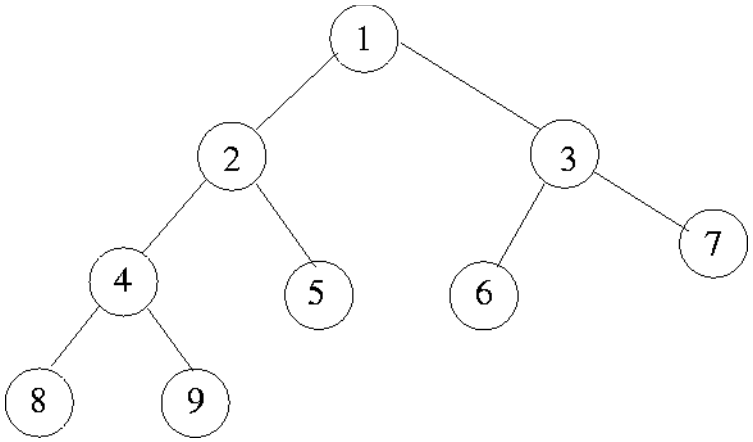
4. Guangli

Program Name: Guangli.java **Input File: guangli.dat**

The English language has many ways to refer to family members. Your cousins share a grandparent, but your second cousin once removed could refer to people a generation before or after you. What a confusing, imprecise language. Guangli does not like figuring out how his family members relate to him in English. Luckily, this isn't a problem since Guangli isn't a person. He's a node in an *infinite binary tree*!

The language of the binary trees is even less precise. Each node has a numeric label, a left child, and a right child. An *infinite binary tree* has an infinite number of nodes. Consider the following infinite binary tree: the root has label 1. Each node with label **`x`** has a left child with label **`2x`** and right child with label **`2x + 1`**. Here is a picture of the first few levels of this tree.



For example, the distance between 2 and 9 is 2, as there are two edges between them. (2 → 4 → 9). Given a pair of nodes in this tree, what is the distance between those nodes?

Input: The first line of input is T (T <= 50), the number of test cases. Each test case contains two space-separated integers A and B, the labels of the two nodes. 1 <= A, B <= 10^18.

Output: For each test case, output a single integer: the distance between the two nodes, formatted as in the samples.

Sample input:

```
4
2 9
16 15
7 12
1 1000000000000000000
```

Sample output:

```
Case #1: 2
Case #2: 7
Case #3: 3
Case #4: 59
```